

satisfactory; the *Maurus* being chosen as the type, and no mention made of other difference except length of canines, the various species may be supposed to present no material departure from the type in form of molars. The third molar in the fossil is so much worn as not to admit of being compared with drawings from unworn teeth; the fourth is like that of the *Maurus*, but the fifth does not resemble the analogous molars of any of the existing species as represented by F. CUVIER, for the fossil tooth possesses a small interstitial point of enamel at the inner side, which does not appear to have place in any of those delineated. The incisors are absent, but the intermaxillary is clearly distinguishable.

Were it not for the size of the canine and the fifth molar, the specimen presents some resemblance to the genus *Macacus*, given as the type of the genera *Macacus* and *Cynocephalus*; the smallness of the canine and the large size of the molars causes the fossil to approach more nearly to the *Semnopithecus* than to the *Macacus*; the difference is, however, great between the two, for the *Entellus* is said to attain the length of three and a half feet, whereas the length of the fossil animal, if the space occupied by the molars and their size be deemed sufficient ground for a conjecture, must have been equal to that of the *Pithecus Satyrus*—the space taken up by the molars is 2.15 inches. This circumstance, and the differences before pointed out, clearly separate the fossil from the species belonging to the genera *Cynocephalus* or *Semnopithecus*. The specimen is imperfect, but it indicates the existence of a gigantic species of Quadrumanous animals contemporaneously with the Pachyderma of the Sub-Himálayas, and thus supplies what has hitherto been a desideratum in Palæontology—proof of the existence, in a fossil state, of the type of organization most nearly resembling that of man.

NOTE.—Fig. 2 in the Plate is a little foreshortened in order to show the bottom of the orbit at *a*, which in an accurate profile view is hidden by the ascending part of the orbit, the section of which is seen at *b*.

Both figures were taken with the camera lucida.

VIII.—*Descriptive Catalogue of a collection of Land and Fresh-water Shells, chiefly contained in the Museum of the Asiatic Society. By W. H. BENSON, Esq. B. C. S.*

PART 2.—FLUVIATILE SHELLS.

(Continued from page 358.)

19. *Planorbis umbilicalis*. Testa quasi dextrâ luteo-corneâ, politâ, leviter radiato-striatâ, infrâ excavato-depressâ, anfractibus omnibus versus umbilicum profundum spectantibus, ultimo interiores penè

tegente ; suprâ convexâ, versùs apicem planatâ, apice concavo, omnibus anfractibus satis apparentibus : periphæriâ obtusè angulatâ. Diam. 0.3 poll.

This shell, belonging to the same division of Planorbis as the British species *Pl. fontanus*, (*Pl. nitidus*, LAMARCK,) in which the whorls on the inferior side are nearly covered by the succeeding ones, may easily be distinguished from that species, which it resembles also in colour, by the greater convexity of the last whorl towards the periphery, and by the slope towards the penultimate whorl, on the under side ; while in *Pl. fontanus* the convexity is next to the penultimate whorl, and the slope tends towards the circumference. The disposition observed in *Pl. umbilicalis* occasions a great concavity on the under side of the shell. The superior margin of the aperture, as in most of the depressed Planorbis, projects much behind the inferior margin, occasioning a great obliquity from the plane of the axis. The North American species *Pl. deflexus* and *Pl. exacuens* of SAY, more especially the latter, have an affinity to this shell, which is probably an inhabitant of the streams of *Silhet*.

20. *Planorbis trochoideus*. Testâ quasi dextrâ diaphanâ, subtrochiformi, suprâ glabrâ, rotundato-convexâ, apice concavo-depresso quasi umbilicali ; anfractibus omnibus parùm apparentibus, saturâ excavatâ divisâ ; infrâ radiatim striatâ, truncatâ, planatâ, umbilico contracto. Anfractu ultimo majori reliquos amplectente, suprâ penè, infrâ omninò obtegente ; periphæriâ acutâ.

The last whorl altogether conceals the other whorls on the lower face of the shell, leaving merely a contracted umbilicus in the centre, towards which the flattened surface declines. On the upper side only a small portion of the depressed spire is shewn, the whorls being rather compactly wound. The species differs from all others hitherto described in the singular truncated form of the inferior surface, and in the circumstance of the last whorl winding closely round the axis, as in many Helices and Trochi, without the intervention of the preceding whorls, none of which are visible in the very contracted umbilicus. The only shell of the genus which bears any very near resemblance to it in the formation of the under side, is *Pl. fontanus* of British authors, (*Pl. nitidus* of LAMARCK,) the umbilicus of which is unusually contracted when compared with other species of the genus, but still exhibits within its vortex the whole of the preceding whorls, and so does not deviate from the recorded generic character ; while the species now brought to notice renders nugatory, as far as it is concerned, two important characters of Planorbis, viz. " anfractibus omnibus utrinque conspicuis," and " aperturâ ab axe remotissimâ." For the

present, considering that a similar variation of character in *Trochus* and *Helix* has not prevailed to separate species from those genera, I have not thought it necessary to detach *Pl. trochoideus* from *Planorbis*, but am inclined to consider it as one of the terminal species; merely prefixing to each of the characters above quoted the word "crebrius."

As this form does not belong to the *Silhet* collection, and is an inhabitant of the neighbourhood of *Calcutta*, I intended to have included it in a paper on some other new Bengal species; but as it is desirable, in consideration of its interesting and anomalous structure, that its publication should not be delayed until I can devote leisure to their description, I seize the present opportunity for making it known.

The only specimens met with were taken by me, in August 1835, in the gardens of *Barrackpur* Park, near a tank, on the margin of which are some artificial ruins. They inhabited large earthen vessels filled with water, containing aquatic plants, and adhered to the prone surfaces of the floating leaves in company with a small *Planorbis**, and a small lengthened *Lymnæa* which approaches in its characters to *L. chlamys* of this catalogue.

21. *Planorbis compressus*, HUTTON, J. A. S. vol. iii. p. 91, No. 12.

The *Silhet* specimens scarcely differ from weathered individuals of Lieut. HUTTON'S shell, in which the extremely delicate carina, which margins the angular periphery in perfectly fresh specimens, is more usually found to be obliterated. The depressed whorls are equally visible on each side, and are highly polished in recent examples. They occur in great perfection near *Banâras*, adhering to the floating foliage of *Trapa natans*, and occasionally swimming at large on the surface of jhils. This is the species alluded to by me as *Planorbis B.* in page 264, vol. i. *Gleanings in Science*, and figured as No. 10, Plate VIII.

22. *Planorbis Indicus*. *Pl. corneus*? HUTTON, J. A. S. vol. iii. p. 90, and BENSON, *Gleanings in Science*, page 264, Plate VIII. fig. 6.

Testâ discoidea, albidâ vel corneâ, supernè plano, suturis excavatis, umbilico depresso; subtùs planato-depressâ, latè umbilicatâ; anfractibus ventricosus transversè profundè et eleganter striatis ætate variabilibus munitis. Aperturâ rotundatâ, auriformi, minimè obliquâ.

Pl. Indicus is scattered over the whole of the Gangetic provinces, and scarcely a pool of water can be found destitute of it. The *Silhet* specimens prove to be a small corneous variety occasionally to be

* I omitted to take specimens of this shell, which is either *Pl. compressus* of HUTTON, or a new *Calcutta* species, *Pl. nanus* mihi, which is very similar to the British species *Pl. albus*.

met with to the westward. In some waters the species attains a great size, being 0.9 of an inch in diameter, and nearly equalling in magnitude *Pl. corneus*, which it resembles in general appearance, but from which it will be found to differ in the depth and regularity of the striæ, in the comparatively less profound excavation of the sutures on the upper side, and less profoundly sunk apex, as well as in being somewhat less ventricose. The animal is most commonly of a black olive colour, occasionally dark maroon red.

In the foregoing descriptions of *Planorbis* I have used the words upper and lower with reference to the faces of the disc which adjoin respectively the back and foot of the animal when creeping. The animal of *Planorbis* is undoubtedly sinistral, but if the shell be viewed as such practically, and placed with the side which would in a sinistral shell be accounted the apex uppermost, it will be found that the animal is on its back, and that it will have to twist its body half round in order to gain the ground with its foot; and that in order to creep with any ease, it must reverse the position of its shell. This will be more especially observable in the flatter and more oblique mouthed species. I propose, therefore, to consider that face as containing the apex, in discoid shells, which is contiguous to the back of the animal. This side may invariably be known in *Planorbis* by the greater projection of the lip in that part, by the deeper depression of the central umbilicus, and by the more considerable involution of the whorls occasioning a greater depth of suture.

Observers have, in general, adhered to no fixed rule on the subject, and have been guided chiefly by the aspect of the shell. TURTON'S characters of *Pl. fontanus* and *Pl. contortus* afford an instance of the same side being considered the upper in one species, and the lower in another. LAMARCK was more consistent, and while he rightly viewed the shell as sinistral, called, in every species, that side of the shell which is contiguous to the back of the animal, the lower face. On the other hand, it is evident, from SAY'S description of *Pl. deflexus* and *Pl. corpulentus*, and from his denominating those species dextral, that, in those shells at least, he has followed the contrary rule.

23. *Lymnæa chlamys*. Testâ translucente, corneâ aut castaneâ, elongato-ovatâ; spira gracili, brevior, acuminatâ; anfractu ultimo infrâ præcipuè ventricosus; suturis parçè depressis; aperturâ infrâ patente, basi leviter evasâ.

The *Lymnæa* in the *Silhet* collection is the chestnut-coloured variety. The paler kind is met with in great perfection in *Lehtára* jhíl, near *Banâras*, in company with *Planorbis compressus*, and another fine *Lymnæa* which I designate as *Lymnæa Butta*. The *Silhet* shell has an

eroded spire, and consequently wants the graceful appearance of the western variety. I at first described it as a distinct species, but a comparison with a good series from *Banâras*, where the species is very variable, has led to their reunion.

Lieutenant HUTTON has referred the species with a mark of doubt to *L. limosa*, which it in no wise resembles. In perfect specimens the spire occupies about one-fifth of the total length. Greatest length of the shell 1.4 inches.

24. *Paludina oxytropis*. Testâ tenui ovato-conicâ olivaceâ, decussatim striatâ; anfractibus supernè carinis plurimis fuscis ornatis, ultimi carinâ mediâ saliente subacutâ; infernè fasciis quibusdam elevatiusculis fuscis; suturis inconspicuis; apice acutâ; canali umbilicali excavato; aperturâ intùs violaceâ, peristomate acuto, nigro. Long. 1.7 poll. Lat. 1.3.

This is a very remarkable and elegant species. Some of the specimens are, I believe, much larger than the one described.

25. *Paludina Lecythis*. Testâ tenui, globoso-conicâ ampullaceâ, olivaceâ, glabrâ, rugis obsolete decussatâ; spirâ obtusiusculâ; anfractibus valdè ventricosus, rotundatis; suturis excavatis; aperturâ intùs violaceâ spiram longitudine superante; peritremate nigro, subreflexo; umbilico evanescente.

The striæ of growth, or rather the indications of former lips, are very frequent and prominent near the back of the outer lip; the rest of the shell presents that facet-like appearance which is so remarkable in some *Lymnææ*. I was at first inclined to consider this shell to be GRAY'S *Pal. Chinensis*, figured, but not described, in GRIFFITH'S CUVIER; but our shell is much more ventricose, the sutures are more pronounced, and it is deficient in the angular appearance observable at the base of the aperture in the Chinese species. It is a very thin shell in proportion to its volume. The epidermis is greenish olive in young specimens, reddish fuscous in the adult. Long. 2 poll. Lat. 1.7.

25½. *Paludina Bengalensis*, LAMARCK. Idem. var. *balteata*, fasciis elevatiusculis.

26. *Paludina crassa*, HUTTON'S MSS. and J. A. S. vol. iii. p. 90, No. 5.

Testâ ovato-conoideâ, ventricosâ, solidâ, pallidè virente, obsolete fasciatâ, rugis exilissimis decussatâ; anfractibus tumidis, suturis excavatis; spirâ obtusâ; umbilico subcanaliculato; aperturâ intùs lactescente. Long. 1 poll.

This species varies in configuration even in the same waters, some specimens approaching to a subglobose form, while others have a

more lengthened conoid spire. It is very abundant in the river *Gúmti* at *Jónpur*, where it is paler, and has a more yellowish tinge than the *Silhet* variety, which, from having an eroded summit, appears to have inhabited stagnant water. It has a singular habit, for the genus, of burying itself in the mud or sand in shallow water, often in large societies; other species conceal themselves in the mud in the season of drought, but *P. crassa* does so from choice, and is impelled by no such necessity. The shell of the lately excluded young is so depressed and globular, that it might be easily mistaken for a young *Ampullaria*. The adult shell attains a degree of thickness unusual in the genus.

27. *Paludina pulchella*. Valvata, No. 9, HUTTON, J. A. S. vol. iii. p. 90.

Testâ ovato-conicâ leviter striatâ, epidermide olivaceâ; anfractibus rotundatis, suturis depressis. Aperturæ peritremate nigrescente; umbilico arcto. Long. 0.3 poll.

Aperture occupying half the length of the shell.

28. *Ampullaria*. The specimens of this shell, which is common in Bengal, are much superior in size to any which I have met with west of the *Brahmaputra*. As I have reason to believe that the species is described, I shall content myself with this allusion to it. I should have considered it to be *A. fasciata* of LAMARCK, were it not that that species is said to have a corneous operculum.

29. *Melania variabilis*. Testâ elongato-turritâ solidâ olivaceâ vel piceâ, sub epidermide albidâ; anfractibus convexis transversè liratis, longitudinaliter striatis et costatis; costulis anfractûs ultimi supernè nodulosis; apice plerumque truncato; suturis excavatis. Aperturâ intus violaceâ, columellæ basi sinuatâ.

Inhabits the river *Gúmti* at *Jónpur*, and Tolly's nullah near *Calcutta*.

Var. A. Anfractuum inferiorum liris elevatis, nodulis elevatioribus. Inhabits river *Húghli* at *Calcutta*.

Var. B. Liris, medianâ exceptâ, obsoletis; nodulis subspinois carinam humeralem coronantibus.

Var. C. Lævis liris costulisque obsoletis, anfractûs ultimi medio subcarinato, adulti nodulis humeralibus frugaliter sparsis.

Var. D. Anfractuum superiorum costulis obsoletis, ultimi et penultimi liris transversis costulis longitudinalibusque supernè serie duplici nodulosis.

Varieties B, C, and D are in the *Silhet* collection. The type specimens of several of these varieties would, if viewed apart, be easily mistaken for distinct species, but they melt into each other so gradu-

ally, occasionally shewing the characters of more than one variety combined in the same shell, that no doubt remains of their blending in one species. In Tolly's Nullah I took larger specimens than any in the collection; though at least four twists of the spire were defective, one individual measured 3.4 inches in length. The *Gúmtí* specimens are less liable to truncation, and in young specimens the apices are nearly perfect. I have not observed more than 12 whorls present in any specimen. I described the type of the species without a name as species A* in the 13th No. of the *Gleanings in Science*. It was figured as No. 7, in Plate VII. vol. i.

30. *Melania Stephanus*. Testâ ovato-conicâ, gradatâ, plerumque deinde truncatâ globoso-ovatâ, olivaceâ anfractibus obsolete fasciatis, transversè sulcatis, supernè planulatis, spiris brevibus validis coronatis; aperturâ albidâ subrotundatâ, supernè ferè angulatâ; labro subdenticulato.

This shell, which is very solid, approaches in form to *M. Amarula*, but differs from it in the configuration of the aperture, and in the comparative shortness of the whorls, as well as by the denticulations on the inner edge of the labrum. Among the numerous specimens which I had an opportunity of inspecting, only a single individual was perfect, and the greater number exhibited only two whorls, the remainder being truncated. This character I find to be an usual indication of habitation in stagnant water. The sulcations on the whorls are sometimes obsolete.

31. *Melania zonata*. Testâ ovato-conicâ, lævi, longitudinaliter striatâ, olivaceâ, zonis tribus brunneis fasciatâ; anfractibus leviter convexis, suturis minimè profundis; aperturâ albidâ ovato-oblongâ infrâ subangulatâ. Long. 0.85 poll.

This a very distinct and pretty species, with a strong epidermis. It is generally eroded at the apex.

32. *Melania Terebra*. Testâ elongato-turritâ, olivaceo-brunneâ, lævi, politâ; anfractibus tumidis; suturis excavatis; sinu inter basin labri columellamque nullo. Long. 1.05. Testa truncata.

It is distinguished from the young of the smooth variety of *M. variabilis* by the want of angularity at the centre of the lower whorl, by its polished epidermis, more tumid whorls and more deeply sunk sutures, as well as by the absence of the sinuation of the inner lip which characterizes that species. The apex of the shell is more or less truncated.

33. *Melania conica*, GRAY? Testâ solidâ, globoso-conicâ, longitudinaliter striatâ plerumque transversè obsolete sulcatâ; anfractibus, ultimo ventricoso cæteris rapidè diminutis; suturis bene signatis; aperturâ

ovatâ, intùs albidâ, fasciis quibusdam castaneis ornatâ; labro intùs denticulato.

This species resembles so closely the figure given in GRIFFITH'S CUVIER, Pl. 14, f. 3, as *Melania conica* of GRAY, that I am unwilling to describe it as new, in the absence of a specific character of that shell. GRAY'S figure, however, does not exhibit the obsolete sulcations of the shell under review,—an omission which may be attributed to the brown incrustation with which they are ordinarily obscured, nor the smoothed denticulations which ornament the interior margin of the right lip in our shell. Should it eventually prove to be distinct, it may be named *M. denticulata* from this character, which is also possessed in a minor degree by *M. Stephanus*. The spire is eroded in all the specimens which I have examined. Length one inch.

34. *Neritina depressa*. Testâ solidâ, sub-convolutâ transversè ovatâ, gibbosâ, olivaceâ, longitudinaliter purpureo-fusco latè strigatâ, strigis versus apicem angulato-flexuosis; spirâ depressâ; anfractibus sub-binis; peritremate integro acuto, sub-orbiculari; septo calloso magno; aperturâ parvâ, lunatâ, aurantiâ; labio sub-recto, medio emarginato, ibi denticulato.

Greatest transverse diameter 0.8 inch. The peritreme which surrounds the aperture and shelving callus is nearly free, and occupies nearly the whole face of the shell. All within it, including the septum as well as the aperture, is usually of a dull orange colour. When *weathered* the shell is whitish, with pink bands and zig-zag lines; the denticulations of the inner lip are occasionally obsolete. The individuals in the Society's collection are probably from the *Sundarban* rivers, as the species is common, adhering to wooden piles and brick-work in the Húghlí at Calcutta, as well as in waters which have periodical communication with it. The following species is so nearly allied to *N. depressa* that I shall describe it here for the purpose of instituting a comparison and pointing out the distinctive characters, although no example of it occurs in the collection.

35. *Neritina cornucopia*. Testâ solidiusculâ, convolutâ, subsymmetricâ, transversè ovato-acutâ, gibbosâ, pallide virente, punctis minimis nigris, interdum confluentibus, lineis longitudinalibus dispositis ornatâ; sporâ valdè depressâ; anfractu pone callum compresso, sub-mediano, minimè obliquo; peritremate acuto, libero, ovato, pene totam testam circumcludente; callo magno ingrescente; aperturâ lunatâ mediocri; labio recto totâ longitudine denticulato, medio emarginato.

Greatest transverse breadth 0.7 inch. At the first glance this shell would probably be mistaken for the last described species, from

which it differs more especially in the greater proportionate size of the aperture, in the perfect parallelism of the inner lip with the axis of the shell, its denticulation nearly throughout its whole length, instead of merely in the centre; in the compression of the whorl at the back of the callus, and its subcentral position, thereby occasioning the approach of the shell to a symmetrical configuration, and finally in its suite of colours. It is much less frequent than *N. depressa*. I have met with only two specimens, in the Húglí at Fort William, and in Tolly's Nullah, adhering to piles and bricks. The aperture is livid white, with blackish shades. The operculum, following the form of the aperture, is broader than in *N. depressa*, and its two costate teeth are more developed.

36. *Neritina tigrina*. Testâ globoso-conoideâ, corneâ vel olivaceâ, lineis subtilissimis, fasciis angulato-flexuosis, maculisque nigris longitudinaliter strigatâ; suturis obsoletis; anfractu ultimo ventricosos, infrâ suturam excavato-depresso; aperturâ obliquâ, intus albâ; callo columellari maculâ luteâ notato; labio medio emarginato, infrâ projecto, emarginatione projecturâque ambabus denticulatis.

The specimens, in the collection, of this very handsome species are of an ordinary size. A fine individual which I took adhering to the piles which defend Fort William from the action of the Húglí, measures 1.35 inches in length. The operculum is very strong, and besides the two exerted mucrones at the lower part, have two strong radiating curved ribs on the inner surface, the central one of which forms, at its termination, a third mucro. In addition to the living examples which I met with in the River Húglí, I have a beautiful specimen which I captured in the aqueduct that supplies the old Course at Calcutta. When decorticated the ground of the shell is white; and the black markings assume a purplish hue.

Two other very distinct species of *Neritina* with oblique apertures inhabit the waters around Calcutta. I propose shortly to describe them as *N. retifera* and *N. obtusa*.

In all the species of *Neritina* of which I have seen the operculum, that accessory piece is smooth and polished, exhibiting only faint radiating striæ or striæ of growth; but in a ribbed *Nerita* which occurs at the embouchure of the Húglí, the exterior surface of the operculum is granulated like shagreen. Is this latter character permanent in the genus *Nerita*? if so, it will furnish an additional mark to distinguish the two genera.

37. *Navicella compressa*. Testâ transversè elongatâ, compressâ, luteâ, albidâ, vel corneâ, lineis munitissimis transversis diversè colo-

ratis, maculisque alternatis radiantibus decoloratis pictâ; dorso elevato; limbi extremitatibus emarginatis. Long. 0. 85, Lat. 0. 45 poll.

From the peculiar form of the aperture of this shell, it is evidently accustomed to adhere to the convex surfaces of cylindrical bodies of small diameter, probably the stems of shrubs growing in the water, to which the sinuous disk would exactly conform. The numerous specimens in the collection all possess the same feature, which is never observable in *Navicella tessellata* of LAMARCK. The last mentioned shell I discovered adhering in abundance to piles in the Húghlí river under Fort William, and more rarely attached to bricks in Tolly's Nullah. I have retained the name proposed for the new species by Dr. J. T. PEARSON.

ACEPHALA.

38. *Anodonta soleniformis*. Testâ elongatissimâ, posticè angustatâ, extremitate rotundatâ; anticè latiore, sub-alatâ, extremitate obliquè truncatâ: Natibus complanatis, inconspicuis, senectute oblitteratis, decorticatis; epidermide junioris fulvidâ, præter angulum umbonis viridi, salcis illuc vinis impressâ, ætate fuscâ. Long. 6 poll. Lat. prope apicem 1. 2, Lat. prope alam 1.5 poll.

This is a very interesting shell, being, in proportion to its length, the most elongated of the genus. The pearl of the interior is bluish, with a salmon tinge in old specimens, which are likewise much worn on the exterior surface, and have their posterior muscular impression very deeply marked, and, as it were, carious. The anterior muscular impression is considerably elongated under the transverse direction. With the exception of a minute species which inhabits ponds in *Bundelkhand*, this is the only *Anodonta* hitherto met with in this Presidency.

39. *Unio cæruleus*, LEA. Trans. Amer. Phil. Socy. vol. 4.

A compressed variety of this shell occurs in the collection.

40. *Scaphula celox*. Testâ elongatâ, tumidâ, læviusculâ, anticè angulatâ, inter umbonem extremitatemque anticam subito evasâ; carino umbonali compresso, costulâ obsoletâ contiguâ.

Scaphula: BENSON, Zoological Journal, Vol. 5, page 464-5, and Gleanings in Science, Vol. 1, Plate VII, fig. 2 and 3.

One or two examples of this rare fluviatile genus of Arcacea which I first discovered in the Jumna, and subsequently met with in the river Cane, occur among the shells brought from the Eastern frontier.